From: Hartley, Jim/SAC
Sent: Wednesday, March 23, 2005 1:58 PM
To: Collar, Robert/SCO
Cc: Simpkin, Tom/DEN
Subject: pCBSA Memo.doc

In addition to 1,4 Dioxane, here's a recent memo on pCBSA fyi

TECHNICAL MEMORANDUM CH2MHILL

Current Understanding of p-Cholorobenzenesulfonic acid (pCBSA) for Groundwater Studies

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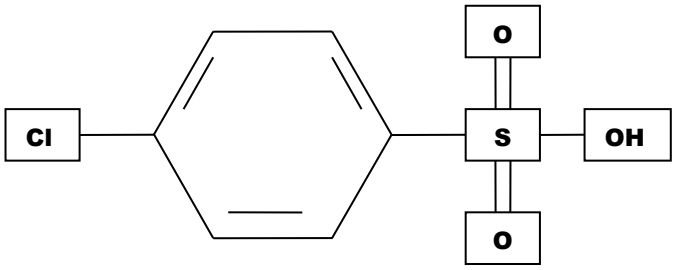
p-Chlorobenzenesulfonic acid (pCBSA) is a by-product of the manaufacture of DDT. It has been found at Superfund sites that are near former DDT manufacturing areas, or in areas that have received wastes associated with DDT manufacture.

Although several sites have some reference to pCBSA, only two seem to have extensive public documentation regarding its migration, fate and toxicity: Stringfellow Acid Pits, in Glen Avon, CA; and Montrose Chemical/Del Amo Superfund Site, southern California.

This memorandum summarizes what seems to be known about this chemical as an environmental contaminant. Like others which have been brought to public attention, this compound is extremely mobile due to its aqueous solubility, and not substantially researched as far as toxicity. In pCBSA's case, however, the only toxicity studies that can be found suggest that its risk to human health or the environment is not great; moreover, this preliminary finding seems to have suppressed the priority for further research, so that information from 5 years ago may still be the most up to date.

Chemical Structure and Properties



p-Cholorobenzenesulfonic acid (pCBSA)

pCBSA can be represented as follows:

pCBSA is highly soluble in water, especially when compared to other contaminants such as chlorobenzene and benzene. pCBSA is also highly soluble in benzene, and therefore referred to as a transphilic acid (as opposed to hydrophilic or hydrophobic). pCBSA has been found to disperse more widely that its associated discharge compounds.

Environmental Fate and Toxicity

At the Montrose Chemical/Del Amo Superfund site, pCBSA seems to have dispersed more broadly than the original benzene plume, with no apparent attenuation other than dispersion. At the Stringfellow hazardous waste disposal site, pCBSA is found originally in the discharged waste stream of the treatment plant, together with other hydrophobic and hydrophilic acid and neutral compounds. In the groundwater, pCBSA (as a transphilic acid) appears to progressively fractionate to other hydrophobic and hydrophilic compounds, in the presence of naturally occurring fulvic acid. This fractionation (conversion into alternate compounds), promoted by an intervening organic acid, represents the only non-dispersive attenuation process suggested for pCBSA in the environment.

In terms of suggested toxicity, there is a limited number of studies which, if relied upon, would indicate a low toxicity for pCBSA. In these studies indicator tests performed did not give indications of mutagenicity (causing mutations) or teratogenicity (causing birth defects) in laboratory animals. In another study there was an indication that another chemical was converted into pCBSA by the body in order to excrete it: pCBSA has a high water solubility. This may mean that pCBSA residence time in the human body is short compared to other chemicals.

There are no promulgated health-based standards for pCBSA, and no accepted toxicological values for formal risk evaluation. This is due to the absence of any chronic studies and only a small number of limited acute studies of the toxicity of pCBSA in animals. This conclusion of the state of knowledge of the toxicity of pCBSA was first published in 1999; a 2004 conversation with the USEPA Region IX specialist involved in this work reported that no new chronic studies had been performed in the intervening 5 years to add to the knowledge of its toxicity.

One non-promulgated and provisional standard for pCBSA was established by the State of California, as a No Observed Adverse Effect (NOEL) standard of 1 mg/kg/day, which would approximately translate to a provisional drinking water standard of 25,000 ppb, based on one sub-chronic non-cancer study. In private

comment with the USEPA specialist, however, this value was considered both tentative and possibly low, though no prospect for a broadly accepted value seems likely.

References

Compound data courtesy of WCAS Laboratories, Santa Fe Springs, CA;
http://www.wcaslab.com/tech/PCBSA.htm

Record of Decision, Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Decision Summary: Section 8.4 (Risk Status of pCBSA), March 1999.

Record of Decision, Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Response Summary: Section 2 (Responses to Short Written Comments), March 1999.

Leenheer, Jerry A. , John Hsu, and L.B. Barber, "Transport and fate of organic wastes in groundwater at the Stringfellow hazardous waste disposal site, southern California." Journal of Contaminant Hydrology 51 (2001), pp. 163-178.

Telephone conversation, Jeff Dhont, USEPA Region IX, November 18, 2004.